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Behind the shine: An appraisal of five years of Danish CCTV trials.

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Summary

Denmark has been the first nation in Europe to promote the use of Fully Documented Fisheries (FDF) through Remote Electronic Monitoring (REM) and CCTV camera systems, and some pilot schemes for monitoring cod catches have been in place since 2008. In theory, such a scheme could supplement and even potentially replace expensive control and monitoring programs; and, when associated to a Catch Quota management system, incentivize positive changes in fishing patterns in a results-based management approach. However, in practice, the technical and institutional challenges remain important hurdles to overcome for the system to be beneficial and reliable. In this paper we investigate the added value on catch information gained over the last five years, and discuss the future of REM as a monitoring program in the context of the future discards ban.

Introduction

Much of the debate around the current reform of the Common Fisheries Policy has focused on the issue of discards. This has largely been triggered by the delayed recovery of emblematic cod stocks caught in mixed-fisheries. In the North Sea, fisheries have been trapped in a vicious circle where low cod TACs led to increased discards or black landings; and being poorly quantified, these undermined the reliability of the stock assessment, leading in turn to even lower TACs the next year. This explosive situation called for radical action; and from 2006 onwards a variety of initiatives have been launched to overcome this.

One of the earliest initiatives was launched by Denmark, which in 2007 was the first European nation to officially support an alternative results-based approach to fisheries management. TACs and quotas should relate to the total catch and not only to the landings, and this should break the vicious circle and restore the basis for reliable assessment and effective management. A necessary requirement for entering this new catch quota scheme is however that all catches (and not only landings) are reported and can be documented. DTU Aqua took the first steps towards a "Full documentation by electronic observation" in late 2007, importing the technology from already existing practices in Canada, New Zealand and Australia. A first pilot project was initiated over 2008-2009 (Kindt-Larsen *et al.*, 2011), which yielded rapid political support at the regional North Sea level. Since 2010 the EU has thus endorsed the rewarding of vessels entering Fully Documented Fisheries with additional cod quota in the North Sea and Skagerrak. FDF trials have continued in Denmark since then. However, the time series of collected FDF data has not been analyzed in depth so far. This article investigates the validity and consistency of available cod catch (discards) estimates using FDF data vs. conventional observers' information.

Material and methods

The first analysis presents an overall auditing of the accuracy of FDF data, comparing fishers' self-reported catch and effort with what is being controlled using sensors data.

Since 2011 it has been mandatory for all vessels to register discards in logbooks. A second analysis investigates therefore the extent and quality of these self-reported discards, both with and without FDF, compared to observers' estimates. We also compare what would be the 2012 discards estimates for the main cod métiers in the North Sea (area 4) and in the Skagerrak (area 3AN) according to the different

data sources. Finally, a third analysis investigates the effect of having CCTV camera onboard on the overall behavior and discards rate of the individual vessels.

Results and Discussion

Being under the responsibility of the ministerial Danish AgriFish Agency, the FDF data cannot be directly accessed by DTU Aqua. The data available are thus not fully consistent with other scientific databases. Furthermore, video footages must not be archived; it is not possible to come back to historical raw data. Results of the first analysis are partly documented in the annual trials reports published by DTU Aqua over time, and are not detailed here. The second analysis shows contrasted results. All FDF vessels report discards in their logbooks, but only few non-FDF vessels do. However, the overall self-reported discards are sensibly lower than what can be estimated from observers' data (Table 1).

Table 1 (draft). Comparison of 2012 cod discards estimates using different sources of information. Green: method used

Area	Fishery	Land	Disc.	DR (%)	estimation method	Nb. Obs. trips
4	OTB_DEF_>=120_0_0	704	182	21	Only non FDF obs. trips	4
4	OTB_DEF_>=120_0_0	704	96	12	FDF and non-FDF trips	10
4	OTB_DEF_>=120_0_0_FDF	1557	66	4	Only FDF observer trips	6
4	OTB_DEF_>=120_0_0_FDF	1557	15	1	logbooks	Census
4	OTB_DEF_>=120_0_0_FDF	1557	111	7	FDF and non-FDF trips	10
3AN	OTB_MCD_90-119_0_0	1236	1419	53	Only non FDF obs. trips	36
3AN	OTB_MCD_90-119_0_0	1236	1419	53	FDF and non-FDF trips	37
3AN	OTB_MCD_90-119_0_0_FDF	366	10	3	logbooks	Census
3AN	OTB_MCD_90-119_0_0_FDF	366	186	34	Only FDF observer trips	1
3AN	OTB_MCD_90-119_0_0_FDF	366	155	30	FDF and non-FDF trips	37

The third analysis illustrates interesting patterns. As seen from the table 1 above, although there is some degree of uncertainty in the actual discards level of FDF vessels, their average discards ratio is nevertheless sensibly lower than non-FDF vessels within the same métier in the North Sea. A mapping of the landings size distribution of FDF vessels over market categories often show a clear shift (Figure 1).

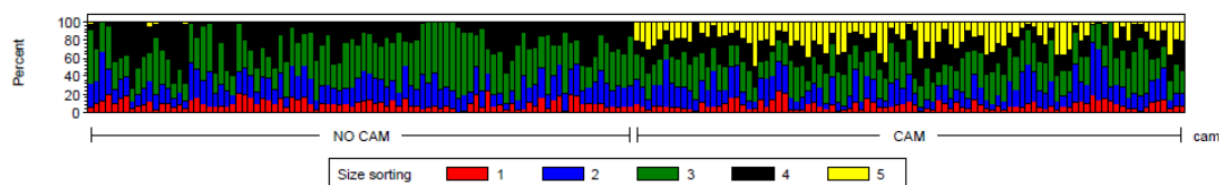


Figure 1 (draft). 2008-2012 market categories distribution per trip of a given vessel trawling with >100mm mesh size in the North Sea, before and after entering the FDF trial.

We conclude that FDF does not make it necessarily easier to estimate discards, and uncertainties remain on the true catches. However, FDF may contribute making the overall problem less important by incentivizing a reduction of discards, and landings are therefore more representative of the catches.

Reference

Kindt-Larsen, L., Kirkegaard, E., and Dalskov, J. 2011. Fully documented fishery: a tool to support a catch quota management system. – ICES Journal of Marine Science, 68: 1606–1610.

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